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Impact on the anthocyanin content and extraction of the postharvest dehydration process of Nebbiolo winegrapes and their relationship with mechanical properties and skin cell wall composition

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Equal contribution to the study

Controlled grape dehydration process induces important changes in the grapes, in particular on secondary metabolites, skin mechanical properties and skin cell wall composition.

Anthocyanin content and extractability were evaluated in *Vitis vinifera* L. cultivar Nebbiolo grapes submitted to controlled dehydration to obtain a maceration kinetic curve and to link these parameters with the berry skin mechanical properties and the skin cell wall composition. The grapes were dehydrated at 25 °C and 65% relative humidity, and sampled at 0 (fresh), 30% and 45% of weight loss. At each point, skin mechanical properties [1], total and extractable anthocyanins [2], and skin cell-wall composition [3] were analyzed.

An increase in the mechanical parameter berry skin break force (F_{sk}) was found between fresh and withered grapes, while berry skin thickness did not show significant differences.

A progressive decrease in total and extractable anthocyanin content (by g of skins) was found, with different extraction kinetics. In the withered grapes the higher concentration of anthocyanins in the medium was found in the first hours of maceration.

The cell wall composition was then analyzed in order to evaluate a possible evolution during the dehydration process. As dehydration progressed, a reduction in the Klason lignin fraction of the cell wall insoluble material was found, while an increase in the percentage of total phenols and proteins was evidenced. As for the polysaccharide structure of the skin cell wall, after depolymerization arabinose, xylose and galacturonic acid were the main monosaccharide constituents for all the samples, and based on these results a hypothesis of the polysaccharide structure was provided.

This study has improved the knowledge about modifications occurring in the grape skins with the dehydration process and the consequences in the extraction of the color.

References

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